05-R-321, Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, New York

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2005 Budget Request *(Current Estimate)*	4Q 2003	4Q 2004	3Q 2005	2Q 2008	79,700	81,000

2. Financial Schedule

(Dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Project Engineering & Design (PED)			
2003	988 [a]	988 [a]	733
2004	2,982 [a]	2,982 [a]	2,949
2005	2,012	2,012	2,300
Construction			
2005	18,465 [a]	18,465	12,000
2006	36,553 [a]	36,553	30,000
2007	18,700	18,700	27,200
2008	0	0	4,518

3. Project Description, Justification and Scope

This project will establish a Nanoscale Science Research Center (NSRC) at BNL. The scientific theme of the BNL Center for Functional Nanomaterials (CFN) is "atomic tailoring of functional nanomaterials to achieve a specific response." The CFN will be a user facility designed to provide a wide range of tools for the preparation and characterization of nanomaterials. The CFN will seek to integrate these unique capabilities with other BNL facilities, including the broad range of synchrotron characterization techniques available at the National Synchrotron Light Source (NSLS).

[a] PED funding was reduced by $12,000 as a result of the FY 2003 general reduction and rescission and by $17,700 as a result of the FY 2004 rescission. This total reduction is restored in FY 2005 and FY 2006 to maintain the TEC and project scope.

The CFN will be a new building, located across the street from the existing NSLS. Siting of the CFN will take advantage of close proximity to the Instrumentation Division and the Departments of Physics, Materials Science, and NSLS, which are key interdisciplinary participants in nanoscience research.

The design and scope of the CFN will fulfill DOE mission needs and incorporate input from potential users, gained through many channels including outreach efforts such as workshops. An essential component of the project is to establish an organizational infrastructure open to external users based on peer review. In this way a truly national nanomaterials effort can create breakthrough opportunities. The laboratory areas are organized into seven clusters established to provide the necessary primary user service. Cluster functions cover a wide range of physical and chemical synthesis and characterization. They are designated Nanopatterning, Ultrafast Optical Sources, Electron Microscopy, Materials Synthesis, Proximal Probes, Theory and Computing, and CFN Endstations at NSLS. The CFN will allow users to control processes, tailoring the properties of materials structured on the nanoscale. Some of these materials, all relevant to the BES mission, include piezoelectrics, ferroelectrics, organic films and conductors, magnetic nanocomposites, and catalysts.

This effort began with preliminary engineering (Title I) and detailed engineering design (Title II) necessary to construct a BNL Center for Functional Nanomaterials. The engineering effort includes all engineering phase activities, including field investigation, preliminary design, specifications and drawings for conventional construction, final design, preparation of procurement documents for experimental equipment, and construction/equipment procurement estimates.

The completed design will enable construction of a new two-story Laboratory/Office building of approximately 85,000 gross square feet. The facility will include clean rooms, general laboratories, and wet and dry laboratories for sample preparation, fabrication, and analysis. Included will be some of the equipment necessary to explore, manipulate and fabricate nanoscale materials and structures. Also included are individual offices and landscape office areas, seminar area, transient user space for visiting collaborators with access to computer terminals, conference areas on both floors, and vending/lounge areas. In addition it will include circulation/ancillary space, including mechanical equipment areas, corridors, and other support spaces.

Technical procurement for the project will include laboratory equipment for the CFN laboratory clusters Nanopatterning, Ultrafast Optical Sources, Electron Microscopy, Materials Synthesis, Proximal Probes, and Theory and Computing as well as for the cluster designated CFN Endstations at the NSLS.

The building will incorporate human factors into its design to encourage peer interactions and collaborative interchange by BNL staff and CFN users and visitors. In addition to flexible office and laboratory space it will provide “interaction areas”: a seminar room and a lunch room for informal discussions. This design approach is considered state-of-the-art in research facility design as it leverages opportunities for the free and open exchange of ideas essential to creative research processes.

4. Details of Cost Estimate[a]

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications at $2,340K)..	3,105	N/A
Project Management costs (2.3% of TEC)	1,820	N/A
Design Management Costs (0.5% of TEC).....	415	N/A
Total, Design Costs (6.7% of TEC)	5,340	N/A
Construction Phase		
Technical Facilities		
Equipment.....	29,480	N/A
Inspection, design & project liaison, testing, checkout and acceptance.....	330	N/A
Project Management (0.2% of TEC).....	135	N/A
Total, Technical Costs.....	29,945	N/A
Conventional Facilities		
Improvements to Land	945	N/A
Building Construction.....	23,465	N/A
Site Utilities	4,420	N/A
Standard Equipment	920	N/A
Removal less salvage	0	N/A
Inspection, design & project liaison, testing, checkout and acceptance.....	875	N/A
Project Management (2.2% of TEC).....	1,725	N/A
Total, Construction Costs.....	32,350	N/A
Contingencies		
Design Phase (0.8% of TEC).....	642	N/A
Construction Phase (14.3% of TEC).....	11,423	N/A
Total Contingencies.....	12,065	N/A
Total, Line Item Costs (TEC).....	79,700	N/A

5. Method of Performance

Design and inspection of the facilities and equipment will be by the operating contractor and A/E subcontractor as appropriate. Technical construction will be competitively bid, lump sum contracts. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

[a] The annual escalation rates assumed for FY 2004 through FY 2007 are 2.5 2.9, 2.8, and 2.6 percent, respectively, using DOE FY 2004 Guidance, January 2002 Update.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 2003	FY 2004	FY 2005	Outyears	Total
Project Cost						
Facility Cost						
Design	0	733	2,949	2,300	0	5,982
Construction	0	0	0	12,000	61,718	73,718
Total, Line Item TEC	0	733	2,949	14,300	61,718	79,700
Other Project Costs						
Conceptual design cost [a]	280	0	0	0	0	280
NEPA Documentation Costs	10	0	0	0	0	10
Other project-related costs	10	0	0	0	1,000	1,010
Total, Other Project Costs	300	0	0	0	0	1,300
Total, Project Costs	300	733	2,949	14,300	62,718	81,000
Total, Project Cost (TPC)	300	733	2,949	14,300	62,718	81,000

7. Related Annual Funding Requirements

(FY 2008 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	18,500	N/A
Total annual operating funding	18,500	N/A

[a] Experimental research will begin at the time of beneficial occupancy of the facility. These research costs are not part of the TPC and are funded by BES.